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Patent

#2 Pre Amdt A J. Boyce 3/25/99

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Igor Y. Khandros

Application No.:

Filing Date: February 5, 1999

For: METHOD FOR MANUFACTURING RAISED ELECTRICAL CONTACT PATTERN OF CONTROLLED GEOMETRY

Asst. Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination of this application, Applicant respectfully requests that the Examiner enter the following amendment.

IN THE SPECIFICATION

On page 1, line 1, please insert --This patent application is a continuation of U.S. Patent Application No. 08/457,479 filed June 1, 1995 (pending) which is a divisional application of U.S. Patent Application No. 08/152,812 filed November 16, 1993, now patent (issued) number 5476211 .

IN THE ABSTRACT

An Abstract is enclosed on a separate page submitted herewith for consideration.

IN THE CLAIMS

Please cancel claims 2-38 before calculating the filing fee in the present application.

Please add the following new claims:

39. (New) An electronic assembly comprising:

a semiconductor die having a plurality of terminals; and

a plurality of interconnection elements, each interconnection element having a portion attached to a respective one of the terminals, and a resilient, elongate, free standing section extending from the portion.

40. (New) The electronic assembly of claim 39 wherein each interconnection element comprises:

an elongate element, of a first material, attached to a respective terminal of the semiconductor die; and

a second material deposited on the flexible elongate precursor element, wherein the elongate element without the second material is flexible, and the elongate element and the second material together are resilient.

41. (New) The electronic assembly of claim 40 wherein the first material includes a material selected from the group consisting of gold, aluminum, copper, silver and platinum.

42. (New) The electronic assembly of claim 40 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper.

43. (New) The electronic assembly of claim 40 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches.

44. (New) The electronic assembly of claim 40 wherein elongate element has a cross-dimension of between 0.0007 and 0.003 inches.

45. (New) The electronic assembly of claim 40 wherein the second material is attached to the respective terminal.

46. (New) The electronic assembly of claim 40 wherein the second material dominates the resiliency of the interconnection element.

47. (New) The electronic assembly of claim 40 wherein the second material is stronger than the flexible elongate precursor element.

48. (New) The electronic assembly of claim 40 wherein the second material is a coating which envelops the elongate element.

49. (New) The electronic assembly of claim 40 wherein the second material includes a material selected from the group consisting of nickel, cobalt, iron, copper, gold, platinum, silver, rhodium and ruthenium.

50. (New) The electronic assembly of claim 40 wherein the second material includes a material selected from the group consisting of nickel, cobalt and iron.

51. (New) The electronic assembly of claim 40 wherein the second material is between 0.00005 and 0.007 inches thick.

52. (New) The electronic assembly of claim 40 wherein the second material is between 0.00010 and 0.003 inches thick.

53. (New) The electronic assembly of claim 40 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches and the second material is between 0.00005 and 0.007 inches thick.

54. (New) The electronic assembly of claim 40 wherein the first material and the second material are both conductive.

55. (New) The electronic assembly of claim 54 wherein the second material is deposited directly on the flexible elongate precursor element.

56. (New) The electronic assembly of claim 40 further comprising a barrier layer between the flexible elongate precursor element and the second material.

57. (New) The electronic assembly of claim 40 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper, and the second material includes a material selected from the group consisting of nickel, cobalt and iron.

58. (New) The electronic assembly of claim 40 wherein the elongate element is a core element and the second material is a coating which is deposited around the core element.

59. (New) The electronic assembly of claim 39 wherein each interconnection element changes direction at least once.

60. (New) The electronic assembly of claim 59 wherein the interconnection element extends from the semiconductor die, whereafter the interconnection element changes direction, whereafter the interconnection element at least partially returns in direction away from the semiconductor die.

61. (New) The electronic assembly of claim 39 wherein the interconnection element has a contact region, distant from the semiconductor die, which remains distant from the semiconductor die upon depression of the contact region towards the semiconductor die.

62. (New) The electronic assembly of claim 39 wherein, for each interconnection element of a first plurality of the interconnection elements, a contact region distant from the semiconductor die on a given interconnection element is substantially in a common plane with corresponding contact regions of the first plurality of interconnection elements.

63. (New) An electronic assembly comprising:

a substrate having a plurality of terminals; and

a plurality of free standing interconnection elements, each including:

an elongate element, of a first material, having a portion connected to a respective terminal of the substrate; and

a second material, on the elongate element, wherein the elongate element is flexible without the second material, and the elongate element and the second material together are resilient.

64. (New) The electronic assembly of claim 63 wherein the substrate comprises a material selected from the group consisting of a semiconductor die, a printed circuit board, a plastic substrate, a ceramic substrate, and a teflon based substrate.

65. (New) The electronic assembly of claim 63 wherein the first material is a readily shaped-material and the second material provides resiliency to the free standing interconnection element.

66. (New) The electronic assembly of claim 63 wherein each interconnection element changes direction at least once.

67. (New) The electronic assembly of claim 63 wherein, for each interconnection element of a first plurality of the free standing interconnection elements, a contact region distant from the substrate on a given interconnection element is substantially in a common plane with corresponding contact regions of the first plurality of interconnection elements.

68. (New) The electronic assembly of claim 63 wherein the first material includes a material selected from the group consisting of gold, aluminum, copper, silver and platinum.

69. (New) The electronic assembly of claim 63 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper.

70. (New) The electronic assembly of claim 63 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches.

71. (New) The electronic assembly of claim 63 wherein the elongate element has a cross-dimension of between 0.0007 and 0.003 inches.

72. (New) The electronic assembly of claim 63 wherein the second material is connected to the respective terminal.

73. (New) The electronic assembly of claim 63 wherein the second material dominates the resiliency of the interconnection element.

74. (New) The electronic assembly of claim 63 wherein the second material is stronger than the elongate element.

75. (New) The electronic assembly of claim 63 wherein the second material is a coating which envelopes the elongate element.

76. (New) The electronic assembly of claim 63 wherein the second material includes a material selected from the group consisting of nickel, cobalt, iron, copper, gold, platinum, silver, rhodium and ruthenium.

77. (New) The electronic assembly of claim 63 wherein the second material includes a material selected from the group consisting of nickel, cobalt and iron.

78. (New) The electronic assembly of claim 63 wherein the second material is between 0.00005 and 0.007 inches thick.

79. (New) The electronic assembly of claim 63 wherein the second material is between 0.00010 and 0.003 inches thick.

80. (New) The electronic assembly of claim 63 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches and the second material is between 0.00005 and 0.007 inches thick.

81. (New) The electronic assembly of claim 63 wherein the first material and the second material are both conductive.

82. (New) The electronic assembly of claim 81 wherein the second material is formed directly on the elongate element.

83. (New) The electronic assembly of claim 63 further comprising a barrier layer between the elongate element and the second material.

Sub C7 84. (New) The electronic assembly of claim 63 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper, and the second material includes a material selected from the group consisting of nickel, cobalt and iron.

85. (New) The electronic assembly of claim 63 wherein the elongate element is a core element and the second material is a coating which is deposited around the core element.

86. (New) An electronic assembly comprising:

a substrate having a plurality of terminals; and

a plurality of free standing interconnection elements, each including:

an elongate core element, of a first material, having an end directly attached to a respective terminal; and

a coating, of a second material, which is deposited around the elongate core element, wherein the elongate core element is flexible without the coating, and the elongate core element and the coating together are resilient.

Sub C8 87. (New) An electronic assembly of claim 86 wherein the substrate comprises a material selected from the group consisting of a semiconductor die, a printed circuit board, a plastic substrate, a ceramic substrate, and a teflon based substrate.

88. (New) The electronic assembly of claim 86 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper.

89. (New) The electronic assembly of claim 86 wherein the elongate core element has a cross-dimension of between 0.0007 and 0.003 inches.

90. (New) The electronic assembly of claim 86 wherein the second material is attached to the respective terminal.

Sub C97

91. (New) The electronic assembly of claim 86 wherein the second material dominates the resiliency of the interconnection element.

92. (New) The electronic assembly of claim 86 wherein the second material includes a material selected from the group consisting of nickel, cobalt and iron.

93. (New) The electronic assembly of claim 86 wherein the second material is between 0.00010 and 0.003 inches thick.

94. (New) The electronic assembly of claim 86 wherein the elongate core element has a cross-dimension of between 0.0005 and 0.005 inches and the second material is between 0.00005 and 0.007 inches thick.

Sub C98

95. (New) The electronic assembly of claim 86 wherein the elongate core element includes a material selected from the group consisting of gold, aluminum and copper, and the second material includes a material selected from the group consisting of nickel, cobalt and iron.

96. (New) An electronic assembly comprising:

a substrate having a plurality of terminals;

a plurality of interconnection elements, each having:

a elongate element, of a first material, having an end directly attached to a respective terminal; and

a second material on the elongate element, the second material being attached to the terminal, wherein the elongate element is flexible without the second material, and the elongate element and the second material together are resilient.

97. (New) The electronic assembly of claim 96 wherein the substrate comprises a material selected from the group consisting of a semiconductor die, a printed circuit board, a plastic substrate, a ceramic substrate, and a teflon based substrate.

98. (New) The electronic assembly of claim 96 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper.

99. (New) The electronic assembly of claim 96 wherein the elongate element has a cross-dimension of between 0.0007 and 0.003 inches.

100. (New) The electronic assembly of claim 96 wherein the second material dominates the resiliency of the interconnection element.

101. (New) The electronic assembly of claim 96 wherein the second material includes a material selected from the group consisting of nickel, cobalt and iron.

102. (New) The electronic assembly of claim 96 wherein the second material is between 0.00010 and 0.003 inches thick.

103. (New) The electronic assembly of claim 96 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches and the second material is between 0.00005 and 0.007 inches thick.

104. (New) The electronic assembly of claim 96 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper, and the coating includes a material selected from the group consisting of nickel, cobalt and iron.

105. (New) An electronic assembly comprising:

a substrate having a plurality of terminals; and

a plurality of interconnection elements, each including:

a elongate element, of a first material, having a portion connected to a respective terminal of the substrate; and

a second material on the elongate element, wherein the elongate element is flexible without the second material, and the elongate element and the second material together are resilient with the second material dominating the resiliency.

106. (New) The electronic assembly of claim 105 wherein the substrate comprises a material selected from the group consisting of a semiconductor die, a printed circuit board, a plastic substrate, a ceramic substrate, and a teflon based substrate.

107. (New) The electronic assembly of claim 105 wherein the first material includes a material selected from the group consisting of gold, aluminum and copper.

108. (New) The electronic assembly of claim 105 wherein the elongate element has a cross-dimension of between 0.0007 and 0.003 inches.

Sub Cl 9

109. (New) The electronic assembly of claim 105 wherein the second material is connected to the respective terminal.

110. (New) The electronic assembly of claim 105 wherein the second material includes a material selected from the group consisting of nickel, cobalt and iron.

111. (New) The electronic assembly of claim 105 wherein the second material is between 0.00010 and 0.003 inches thick.

112. (New) The electronic assembly of claim 105 wherein the elongate element has a cross-dimension of between 0.0005 and 0.005 inches and the second material is between 0.00005 and 0.007 inches thick.

REMARKS

Applicants respectfully request consideration of the application as preliminarily amended herein. No new matter has been added.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 2/5, 1999

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